PATENT CLAIMS

1. A process for the laser machining, especially laser welding, of said workpieces (2), especially vehicle bodies and body parts, wherein a laser beam (14) from at least one said laser source (13) is sent via a guide means (16) to a laser tool (15) at a multiaxial hand (8) of at least one said manipulator (4) and is directed towards the workpiece (2), **characterized in that** said manipulator (4) guides a remote laser tool (15) with a focal distance *F* at a contact-free distance floatingly above the workpiece (2) along a machining path (30) and deflects said laser beam (14) essentially by means of a motion of said hand axes IV, V, VI by said variable deflection angles α, wherein said laser source (13), whose power is variable, is controlled as a function of the motions of said laser beam.

2. A process in accordance with claim 1, **characterized in that** said manipulator (4) guides said hand (8) in a displacing motion relative to said workpiece (2), wherein said beam deflection motion of said hand axes IV, V, VI is superimposed to said displacing motion.

3. A process in accordance with claim 1 or 2, **characterized in that** said manipulator (4) performs an essentially continuous displacing motion, wherein said superimposed beam deflection motion is directed at least partially against said displacing motion.

4. A process in accordance with claim 1, 2 or 3, **characterized in that** said laser source (13) and said manipulator (4) are acted on by a common control (20).

5. A process in accordance with one of said above claims, **characterized in that** one or more programs and at least one technological data bank, with which [program and data bank] said motions to be carried out by said manipulator (4) and said laser process parameters

are determined and carried out automatically on a basis of input workpiece data, are stored and run in a computer (21) and in at least one said memory (22) of said control (20).

6. A process in accordance with one of said above claims, **characterized in that** said power of said laser source (13) and said displacing and beam deflection motions to be performed by said manipulator (4) are determined and controlled according to a section energy to be introduced into said workpiece (2).

7. A process in accordance with one of said above claims, **characterized in that** said workpiece data are input by said operator into said control (21) on site via an input unit (23).

8. A process in accordance with one of said above claims, **characterized in that** one or more tools (27) for said workpiece (2) are controlled by said control (21).

9. A process in accordance with one of said above claims, **characterized in that** a laser tool (15) with a switchable or adjustable focal distance *F* is used.

10. A laser device for said laser machining, especially laser welding, of a workpiece (2), especially vehicle bodies and bodies parts, with at least one said laser source (13), which can be connected via a guide means (16) to a laser tool (15) at a multiaxial hand (8) of at least one said manipulator (4), **characterized in that** said manipulator (4) holds a remote laser tool (15) with a focal distance *F* and guides same floatingly at a contact-free distance above said workpiece (2) along a machining path (30), wherein said manipulator (4) can be controlled in terms of said motion of its hand axes IV, V, VI such that said laser beam (14) can be deflected by variable deflection angles α, and wherein said power of said laser

source (13) can be controlled variably and as a function of motions of said laser beam.

11. A laser device in accordance with claim 10, **characterized in that** said manipulator (4) guides said hand (8) in a displacing motion relative to said workpiece (2), wherein said beam deflecting motion of said hand axes IV, V, VI is superimposed to said displacing motion.

12. A laser device in accordance with claim 10 or 11, **characterized in that** said manipulator (4) performs an essentially continuous displacing motion, wherein said superimposed beam deflecting motion is directed at least partially opposite said displacing motion.

13. A laser device in accordance with claim 10, 11 or 12, **characterized in that** said laser source (13) and said manipulator (4) have a common control (20).

14. A laser device in accordance with one of said above claims, **characterized in that** said control (20) has at least one computer (21) and at least one said memory (22) with one or more programs and with at least one technology data bank, with which [program and data bank] said motions to be performed by said manipulator (4) and said laser process parameters can be automatically determined and carried out on said basis of input workpiece data.

15. A laser device in accordance with one of said above claims, **characterized in that** said power of said laser source (13) and said displacing and beam deflecting motions to be performed by said manipulator (4) can be determined and controlled according to section energies to be introduced into said workpiece (2).

16. A laser device in accordance with one of said above claims, **characterized in that** said control (21) has a input unit (23) for inputting workpiece data by an operator on site.

17. A laser device in accordance with one of said above claims, **characterized in that** said input unit (23) has a keyboard (24) and/or a drive for said portable data storage media (25) and/or at least one interface for a data line (26).

18. A laser device in accordance with one of said above claims, **characterized in that** said laser device (1) has one or more tools (27) for said workpiece (2), which are connected to said control (21).

19. A laser device in accordance with one of said above claims, **characterized in that** said tools (27) are designed as said clamping tools (28) and/or as a conveying means (29) for said workpieces (2).

20. A laser device in accordance with one of said above claims, **characterized in that** said guide means (16) has a modular design and has a plurality of conductor sections (18) that can be connected to a conductor couplings (19).

21. A laser device in accordance with one of said above claims, **characterized in that** said guide means (16) is designed as a fiber optic cable.

22. A laser device in accordance with one of said above claims, **characterized in that** said laser source (13) is designed as a fiber laser, disk laser or diode-pumped Nd-YAG laser.

23. A laser device in accordance with one of said above claims, **characterized in that** said laser

tool (15) has a focal distance *F* that can be switched or adjusted.

24. A laser device in accordance with one of said above claims, **characterized in that** said laser tool (15) has a focal distance greater than 300 mm and preferably greater than 1,500 mm.

25. A laser device in accordance with one of said above claims, **characterized in that** said laser device (1) has a plurality of said manipulators (4) with said laser tools (15), wherein a common laser source (13) can be switched by said control (20) to said different laser tools (15).

26. A laser device in accordance with one of said above claims, **characterized in that** said manipulator (4) is designed as a multiaxial industrial robot, preferably as a six-axis articulated arm robot with said robot axes I-VI.

27. A laser device in accordance with one of said above claims, **characterized in that** said hand (8) has three said rotatory hand axes IV, V, VI.